

II. REMARKS

By the present amendment, claims 14, 18, 19, 22, 34 and 35 have been amended, and claims 38-43 have been newly added.

Claims 14, 18, 19, 22, 34 and 35 have been amended to improve clarity. For example, claims 34 and 35, respectively, have been amended to recite “wherein when the master alloy is cast, the resulting copper alloy cast includes refined grains having a grain size of 50μm or less” as supported on Example 1 and Table 1, in particular, p. 35, lines 14-25, of Applicant’s original disclosure.

New claims 38 and 39, respectively, recite “wherein 0.2% proof strength of the resulting copper alloy cast is improved by 10% or more, comparing to a copper alloy cast obtained without grain refinement” as supported on p. 32, lines 18 to p. 33, line 1 and p. 35, lines 14-25 of Applicant’s original disclosure.

New claims 40 and 41, respectively, recite “wherein the copper alloy cast includes refined grains having a grain size of 50μm or less”. Support for the amendments may be found on Example 1 and Tables 1-3, in particular, p. 35, lines 14-25, of Applicant’s original disclosure.

New claims 42 and 43, respectively, recite “wherein 0.2% proof strength of the copper alloy cast is improved by 10% or more. Support for the amendments may be found on p. 32, lines 18 to p. 33, line 1 and p. 35, lines 14-25 of Applicant’s original disclosure.

The present amendment adds no new matter to the above-captioned application.

A. The Rejections

Claim 14, 18, 19 and 22 stand rejected under 35 U.S.C. § 102(b) as allegedly anticipated over JP 04-099837 (hereafter, “JP ‘837”).

Claims 34 and 35 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over JP 56-090944 as applied to claims 14, 18, 19 and 22 above, and further in view of Acknowledged Prior Art Admission (hereafter “APAA”).

Applicant respectfully traverses the Examiner’s rejections and requests reconsideration of the above-captioned application for the following reasons.

B. Applicant’s Arguments

1. The Section 102 Rejections

Anticipation under 35 U.S.C. § 102 requires showing the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim. Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984).

In this case, the Examiner has failed to establish a prima facie case of anticipation against claims 14, 18, 19 and 22, and new claims 38-43 because JP ‘837 does not teach, or suggest, each and every limitation recited by these claims.

i. JP ‘837

JP ‘837 relates to a copper alloy with a composition constituted of Zr, Zn and Cu. JP ‘837, English language Abstract.

JP ‘837 does not teach, or suggest, the limitations of **independent claim 14**, i.e., (i) “a master alloy for obtaining a copper alloy cast, consisting of: (a) Cu: 40 to 80 wt.%; (b) Zr: 0.5 to 35 wt.%; (c) at least one element selected from the group consisting of Mg: 0.01 to 1 wt.%, Sn: 0.1 to 5 wt.%, B: 0.01 to 0.5 wt.%, Mn: 0.01 to 5 wt.% and Si: 0.01 to 1 wt.%; and (d) the balance of Zn.” The reference also does not teach or suggest the limitations of **independent**

claim 19, i.e., (ii) “a master alloy for casting a copper alloy, consisting of: (a) Cu: 40 to 80 wt.%; (b) Zr: 0.5 to 35 wt.%; (c) P: 0.01 to 3 wt.%; (d) at least one element selected from the group consisting of Mg: 0.01 to 1 wt.%, Sn: 0.1 to 5 wt.%, B: 0.01 to 0.5 wt.%, Mn: 0.01 to 5 wt.% and Si: 0.01 to 1 wt.%; and (e) the balance of Zn.”

JP ‘837 does not teach, or suggest, as required by **new claims 38 or 39**, (iii) “wherein 0.2% proof strength of the resulting copper alloy cast is improved by 10% or more, comparing to a copper alloy cast obtained without grain refinement.”

JP ‘837 also does not teach, or suggest, the limitation of **new claims 40 or 41**, i.e., (iv) “wherein the copper alloy cast includes refined grains having a grain size of 50 μ m or less.” The reference also does not teach or suggest the limitation of **new claims 42 and 43**, i.e., (v) “wherein 0.2% proof strength of the copper alloy cast is improved by 10% or more, comparing to a copper alloy cast obtained without grain refinement.”

The Examiner contends that instant claim 14 is anticipated by samples 8 and 9 in Table 1 of JP ‘837, and claim 19 is anticipated by sample 6 in Table 1 of JP ‘837 (Office Action, dated October 1, 2009, at p. 2, line 18 to p. 3, line 1).

JP ‘837 (i.e., samples 6, 8 and 9 in Table 1) does **not** disclose the master alloy, as claimed. More specifically, copper alloys as shown in samples 6, 8 and 9 do **not** have an amount of Cu which is present in the range of “40 wt.% to 80 wt.%” as claimed. See Declaration of Keiichiro Oishi, filed concurrently herewith.

The balance Cu of samples 6, 8 and 9, as described in Abstract of JP ‘837, contains inevitable impurities being generally at most about 0.1 weight % (hereafter “wt.%”), which is well known to one having ordinary skill in the art. Oishi Declaration, paragraph 6. The wt.% of the balance Cu of samples 6, 8 and 9 can be thus calculated by subtracting wt.% of other elements except for copper and wt.% of the inevitable impurities from 100 wt.%. Id. By this calculation, it is clear that samples 6, 8 and 9 contain the balance Cu of at least about 96.03

wt.%, 97.02 wt.% and 96.05 wt.%, respectively. The wt.% of the respective balance Cu as calculated and other elements that constitute samples 6, 8 and 9, is summarized in Table A reproduced below. Oishi Declaration, paragraph 7.

Table A: Data Compiled from Table 1 of JP '837

		Chemical Composition (wt.%)					
		Cu	Inevitable impurities (present in Cu)	Zr	Zn	Additional Element	Total
Sample	6	At least about <u>96.03</u>	At most about 0.1	0.56	2.89	0.02P, 0.4Mn	100
	8	At least about <u>97.02</u>	At most about 0.1	0.82	1.20	0.21Sn, 0.56Mg, 0.09Si	100
	9	At least about <u>96.05</u>	At most about 0.1	0.95	2.49	0.41Si	100

As shown in Table A above, samples 6, 8 and 9 of JP '837 do **not** show, or even remotely suggest, the master alloy according to independent claims 14 and 19, in particular, the master alloy consisting of "Cu in the range of 40 wt.% to 80 wt.%" as claimed. Id.

JP '837 shows another examples of copper alloys, for example, a first copper alloy containing, by weight, 0.05 to 1.0 wt.% Zr, and 0.1 to 5.0 wt.% Zn, and the balance Cu with inevitable impurities, and a second copper alloy containing, by weight, 0.05 to 1.0 wt.% Zr, 0.1 to 5.0 wt.% Zn, total 0.01 to 3.0 wt.% of one or two elements selected from the group consisting of As, Al, Ag, P, Sn, Mg, Mn, Sb, Co, Pb, B, Si and Fe, and the balance Cu with inevitable impurities (JP '837, English language Abstract, and claims 1 and 2). With the above calculation, the content of Cu in the first copper alloy is defined as 93.9 to 99.75 wt.%, and the content of Cu in the second copper alloy is defined as 90.09 to 99.74 wt.%.

From the above facts and discussion, it is clear that the Cu content of the copper alloys in JP '837 should be at least about 90.09 wt.%, i.e., **outside** the claimed range of Cu, i.e., "40 wt.% to 80 wt.%."

Also, Cu content in the master copper alloy of the present invention is very important for the following reasons. If Cu occupies less than 40 wt.% or more than 80 wt.%, it takes a long time to melt the master alloy. As a result, the effective amount of Zr decreases and the formation of zirconium oxide is facilitated, which results in totally ineffective Zr. Thus, Cu content of the master alloy of the present invention should be neither less than 40 wt.% nor more than 80 wt.% (Applicant's original disclosure, p. 10, line 8 to p. 11, line 18). In other words, the amount of Cu for obtaining a copper alloy cast in the present invention **must** be in the range of "40 to 80 wt.%, " as claimed.

In contrast, as discussed above, the copper alloys in JP '837 contain the amount of the balance Cu of at least about 90.09 wt.%.

As clearly shown above, JP '837 **only** discloses a copper alloy and properties of the copper alloy. There are **no** teachings and/or suggestions provided in the disclosure of JP '837 regarding the resulting copper alloy cast obtained when the copper alloy is cast and unexpected properties of the resulting copper alloy cast.

New claims 38-39 and 42-43 are thus independently patentable, because JP '837 does **not** disclose the copper alloy cast having improved 0.2% proof strength of 10% or more, comparing to a copper alloy cast obtained without grain refinement.

New claims 40 and 41 are also independently patentable, because JP '837 does **not** disclose the copper cast including refined grains having a grain size of 50 μ m or less.

For all of the above reasons, JP '837 does not anticipate the subject matter of independent claims 14 and 19 and new claims 38-43. In addition, claims 18 and 22 are directly dependent from claims 14 and 19, respectively. Thus, JP '837 does not anticipate the

subject matter of claims 18 and 22.

2. The Section 103 Rejections

A prima facie case of obviousness requires a showing that the scope and content of the prior art teaches each and every element of the claimed invention, and that the prior art provides some teaching, suggestion or motivation, or other legitimate reason, for combining the references in the manner claimed. KSR International Co. v. Teleflex Inc., 127 S.Ct. 1727, 11739-41 (2007); In re Oetiker, 24 U.S. P.G.2d 1443 (Fed. Cir. 1992).

In this case, the Examiner has failed to establish a prima facie case of obviousness against claims 34 and 35 and new claims 38-43, because the combination of JP '837 and APAA fails to teach all of the limitations of the claims.

For example, the combination of JP '837 and APAA does not show or suggest the limitation of "wherein when the master alloy is cast, the resulting copper alloy cast includes refined grains having a grain size of 50µm or less" as recited in claims 34 and 35.

Furthermore, (1) the Examiner has failed to establish a legitimate reason to combine JP '837 and APAA to arrive Applicant's claimed invention and (2) the Examiner has failed to demonstrate that a person of ordinary skill in the art would have had a reasonable expectation of success of arriving at the claimed invention even if the modification was made. Thus, the rejections under §103 should be reconsidered and withdrawn.

i. JP '837

JP '837 is discussed above.

As admitted by the Examiner (Office Action, dated October 1, 2009, at p. 4, lines 2-3), JP '837 not teach, or suggest, as required by **claims 34 or 35**, (i) "wherein when the master alloy is cast, the resulting copper alloy cast includes refined grains having a grain size of

50 μ m or less.”

ii. APAA

APAA relates to methods for refining grains of a copper alloy. According to APAA, grains of a copper alloy are refined during melt-solidification of the copper alloy, or by processing the copper alloy in heat. Applicant’s original disclosure, p. 2, lines 1-9.

APAA does not teach, or suggest, as required by **claims 34 or 35**, (i) “wherein when the master alloy is cast, the resulting copper alloy cast includes refined grains having a grain size of 50 μ m or less.”

APAA does not teach, or suggest, as required by **new claims 38 or 39**, (ii) “wherein 0.2% proof strength of the resulting copper alloy cast is improved by 10% or more, comparing to a copper alloy cast obtained without grain refinement.”

APAA also does not teach, or suggest, the limitation of **new claims 40 and 41**, i.e., (iii) “wherein the copper alloy cast includes refined grains having a grain size of 50 μ m or less.” APAA also does not disclose or suggest the limitation of **new claims 42 and 43**, i.e., (iv) “wherein 0.2% proof strength of the copper alloy cast is improved by 10% or more, comparing to a copper alloy cast obtained without grain refinement.”

The Examiner contends that since the claimed alloys are formed by conventional casting method, the claimed grain size would have been inherently possessed by the material and casting (Office Action, dated October 1, 2009, at p. 4, lines 6-7).

Applicant objects to the Examiner’s inherency argument against claims 34 and 35. The Federal Circuit has held that a reference may inherently teach subject matter not explicitly disclosed by the reference when the disclosure is sufficient to show that the implicit subject matter is the natural result flowing from the explicitly disclosed subject matter.

Continental Can Co. USA Inc. v. Monsanto Co., 20 U.S.P.Q.2d 1746, 1749 (Fed. Cir. 1991).

However, inherency cannot be established by mere probabilities or possibilities, and the mere fact that a certain thing may result from a given set of circumstances is insufficient. Id. The Federal Circuit has ruled that inherency is a question of fact. In re Napier, 34 U.S.P.Q.2d 1782, 1784 (Fed. Cir. 1995).

The Examiner's naked speculation falls far short of establishing, without any evidence, that the copper alloy disclosed by JP '837 is inherently capable of producing refined grains having the grain size, i.e., 50 μ m or less, required by claim 34 and 35, via a conventional casting method.

For example, the original specification, p. 5, line 23 to p. 9, line 12, teaches that it is difficult to obtain, when a copper alloy is cast, the resulting copper alloy cast in which refined grains have a grain size of 50 μ m or less as claimed. In order to form refined grains having the claimed size, the master alloy having the claimed composition is cast using specific casting techniques. In particular, it is required, to obtain refined grains having the grain size of 50 μ m or less, that a concentration of metal Zr (in the molten master alloy during casting process) should be controlled in the range of 5 ppm or more, preferably, 20 to 500 ppm. This is very difficult to achieve using a conventional casting method. See Applicant's original disclosure, p. 6, line 15 to p. 7, line 18 and p. 9, lines 2-12. By the above disclosure, one having ordinary skill in the art would instantly know that the copper alloy cast including refined grains having the claimed grain size of 50 μ m or less **cannot** be produced via a conventional casting method. These facts are substantiated by the Oishi Declaration, paragraphs 10-11. For these reasons, the Examiner's inherency arguments against claims 34 and 35 should be reconsidered and withdrawn.

New claims 38-39 and 42-43 are independently patentable, because JP '837 does not disclose the copper alloy cast having improved 0.2% proof strength of 10% or more, comparing to a copper alloy cast obtained without grain refinement.

New claims 40 and 41 are also independently patentable, because JP '837 does not disclose the copper cast including refined grains having a grain size of 50 μ m or less.

iii. Summary of the Disclosures

The combination of JP '837 and APAA does not teach, or suggest, (i) the limitations of claims 34 and 35, (ii) the limitations of new claims 38 and 39, or (iii) the limitations of new claims 40-43.

For all of the above reasons, the Examiner has failed to establish a prima facie case of obviousness against claims 34 and 35, and new claims 38-43 of the above-captioned application.

iv. Unexpected Results Would Rebut Any Prima facie Case, Even if Made

Even assuming a prima facie showing of obviousness had been made, however, (which is not a valid assumption), the unexpected advantages of the claimed combination would be sufficient to rebut any such showing.

According to the present invention, grain refinement, e.g., making refined grains of a copper alloy cast having a grain size of 50 μ m or less as recited in claims 34 and 35, and new claims 40 and 41, is strongly desirable because it is very effective in improving 0.2% proof strength (a strength when permanent distortion reaches 0.2%) of a copper alloy cast. Applicant's original disclosure, p. 1, lines 16-20, and p. 35, lines 14-25. For example, when a master alloy is cast, 0.2% proof strength of the resulting copper alloy cast obtained by grain

refinement is improved by 10% or more as recited in new claims 38, 39, 42 and 43, comparing to a copper alloy cast obtained without grain refinement. Applicant's original disclosure, p. 32, lines 18 to p. 33, line 1.

However, JP '837 and APAA, either solely or in combination, does not disclose the copper alloy cast including refined grains having the grain size of 50 μ m or less, after casting, as claimed, and 0.2% proof strength of the copper alloy cast obtained by grain refinement, improved by 10% or more, as claimed.

v. No Reasonable Expectation of Success of Achieving Applicant's Claimed Invention Even if the Combination of JP '837 and APAA Were Made

A proper rejection under Section 103 requires showing (1) that a person of ordinary skill in the art would have had a legitimate reason to attempt to make the composition or device, or to carry out the claimed process, and (2) that the person of ordinary skill in the art would have had a reasonable expectation of success in doing so. PharmaStem Therapeutics, Inc. v. ViaCell, Inc., 491 F.3d 1342, 1360 (Fed. Cir. 2007). In this case, the Examiner has failed to demonstrate that a person of ordinary skill in the art would have had a legitimate reason to combine JP '837 and APAA, and a reasonable expectation of success of arriving at Applicant's claimed invention even if the modification was made.

While the problem to be solved of the present invention is refining grains of Cu alloy to improve 0.2% proof strength (Applicant's original disclosure, p. 1, lines 16-20), the aim of JP '837 is to provide an electro-conducting material suppressing a migration, which refers to, for example, movement of Cu ions from part having high electrical potential to part having low electrical potential in a circuit, wherein Cu ions are generated when water is present between various gaps of the circuit and, consequently, some portions of Cu alloy are dissolved in the

water (JP '837, English Language Abstract, and col. 2, line 11 to col. 3, line 2). There is no similarity between the present invention and JP '837, in view of object of the invention.

Therefore, a person of ordinary skill in the art would have no reason to combine the references to arrive the Applicant's claimed invention. Even if the improper combination were made, a person of ordinary skill in the art would not have had a reasonable expectation of success of arriving at the Applicant's claimed invention, because, for example, there is no teaching, suggestion or other reason cited by the Examiner to obtain a copper alloy cast having the grain size of 50 μ m or less after casting and refining, as recited in claims 34 and 35, and new claims 40 and 41, and a copper alloy cast of the refined grains, having 0.2% proof strength improved by 10% or more, as recited in new claims 38 and 39, and new claims 42 and 43.

For all of the above reasons, the Examiner has failed to establish a prima facie case of obviousness against the Applicant's claimed invention. Also, the evidence of unexpected results demonstrates the non-obviousness of the claimed invention.

III. CONCLUSION

Claims 36 and 37 are allowed for reasons of record.

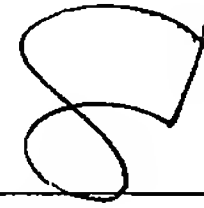
In view of the above amendments and arguments, Applicant respectfully asserts that the Examiner has failed to establish a prima facie case of anticipation and/or obviousness against Applicant's claimed invention.

For all of the above reasons, claims 14, 18, 19, 22 and 34-43 are in condition for allowance, and a prompt notice of allowance is earnestly solicited.

The below-signed attorney for Applicant welcomes any questions.

Respectfully submitted,

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